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## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

REC'D. 20 OCT 2004

WIPO PCT

Applicant's or agent's file reference 4764096WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/09305	International filing date (day/month/year) 01.08.2003	Priority date (day/month/year) 02.08.2002
International Patent Classification (IPC) or both national classification and IPC F16L13/02		
Applicant STOLT OFFSHORE S.A. et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 6 sheets.</p> <p style="text-align: right;">EPO - DG 1</p>		
<p style="text-align: right;">13. 12. 2004</p> <p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>		
Date of submission of the demand  23.02.2004	Date of completion of this report  19.10.2004	
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Dauvergne, B  Telephone No. +49 89 2399-7527 	

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP 03/09305

**I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-19 as originally filed

**Claims, Numbers**

1-37 filed with telefax on 16.08.2004

**Drawings, Sheets**

1/7-7/7 as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 26-37

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 26-37 are so unclear that no meaningful opinion could be formed (*specify*):

**see separate sheet**

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	2, 3, 7, 8, 13-16
	No: Claims	1, 4-6, 9-12, 17-25
Inventive step (IS)	Yes: Claims	2, 3, 7, 8
	No: Claims	13-16
Industrial applicability (IA)	Yes: Claims	1-25
	No: Claims	

**2. Citations and explanations**

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see separate sheet

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**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

**1- Claims 26-34:**

Claims 26-30 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is defined in vague terms, the claims attempting to define the subject-matter in terms of the result to be achieved. In particular, the technical features which are necessary for achieving the quoted results are not present in the claims.

As a result, claims 30 to 34 can not be examined either.

**1- Claims 35-37:**

Claims 35-37 only contain references to the drawings without explicitly specifying the features of the claimed apparatuses and method. Therefore the content of these claims can not be determined.

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

D1: US-B-6 226 8551 (MAINE LESLIE) 8 May 2001 (2001-05-08)

**1- Novelty**

The subject matter of claims 1, 4, 5, 6, 9, 10, 11, 12, 17, 18, 19, 20, 21, 22, 23, 24, 25 lacks novelty (Art. 33.2 PCT) because their features are known from D1

**1-1 Claim 1:**

From D1, a method of joining plastic-lined conduits is known that comprises the following steps:

- providing a first conduit and a second conduit (16, 16A), each conduit comprising a wall of metal defining a bore having an open end for connection and being substantially lined by a plastic liner (18), the liner ending within the bore to leave a short unlined section at the

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open end of the conduit;

- arranging said first and second conduits with their ends abutting (Fig.3) and welding the ends together to form a longer conduit (see col.3, lines 11-12 and col 2/3 lines 61-2);
- providing a tubular bridging member (2) of corrosion-resistant material dimensioned to fit inside the lined conduits, the bridging member having a first sealing portion toward one end thereof and a second sealing portion toward the second end, said sealing portions being interconnected by an intermediate portion, the length of said intermediate portion being sufficient to bridge the unlined portions of the abutting first and second conduits while the first and second sealing portions overlap said liners within the first and second conduits respectively;
- with the first sealing portion of the bridging member located within the first conduit and overlapping the liner, expanding said first sealing portion radially (col.2, lines 61-65) so as to press the first sealing portion against the liner to form a first seal between the liner and the bridging member
- with the second sealing portion of the bridging member located within the second conduit and overlapping the liner of the second conduit, expanding said second sealing portion radially so as to press the second sealing portion against the liner to form a second seal between the liner and the bridging member, whereby the liners, the first and second seals and the bridging member form a continuous barrier between the interior bore of the lined conduits and the metal of the conduit walls,

From col.3, lines 11-12 and col 2/3 lines 61-2, it can be inferred that the dimensions of the bridging member and the sequence of the method steps are such as to ensure that there is space between the material of the bridging member and the abutting ends of the conduits during the initial pass of welding.

1-2 Claim 4:

According to D1, the bridging member may be located adjacent the abutting ends of the conduits prior to starting said welding step, and the outer diameter of the bridging member in its different sections leave a substantial gap between said conduit bore at said short unlined section and said bridging member (see gap see 1-1 and Fig.2).

1-3 Claims 5, 6:

See D1, col.2, line 61 - col.3, line 10.

1-4 Claims 9-12:

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D1 describes a method used for pipelines, it is therefore necessary to repeat the sequences described in 1-1 for forming a pipeline.

1-5 Claim 17:

The tubular bridging member of D1 and the pipes disclosed in D1 (see Fig.2) are adapted for use together in the methods as claimed in any of claims 1 to 16 of the present application.

1-6 Claim 18:

A tubular bridging member of D1 having a smaller central portion (i.e. foreseen for a thicker lining or a slightly smaller pipe) is adapted for free passage through the line portion of conduits of bigger diameters.

1-7 Claim 19-21:

See D1, Fig.1.

1-8 Claims 22-25:

A pair of bullet shaped expansion tools, usually used for expanding sleeves in pipes would match the features of claims 22-25.

**2- Inventive step**

The subject matter of claims 13-16 would appear to lack an inventive step (Art. 33.3 PCT) for the reasons detailed below.

2-1 Claims 13-16:

The use of a pipe according to D1 on a J-lay or S-lay vessel lacks an inventive step since both techniques are known.

Furthermore, lack of unity 'a posteriori' can be raised since claim 1 deals with joining conduits and claim 13 with offshore pipeline laying of a known pipe.

**Re Item VII**

**Certain defects in the international application**

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

The independent claims should be written in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from the prior art (D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

**Re Item VIII****Certain observations on the international application****1- General:**

Lack of clarity of the claims arises, since the plurality of independent claims makes it difficult to determine the matter for which protection is sought. This could lead to a report not examining some of the claims for lack of unity.

This application should be limited to a method of joining pipes.

The reference to the spirit of the invention in the last paragraph should be deleted.



## B Claims as Amended in IPER

## CLAIMS

- 5 1. A method of joining plastic-lined conduits comprising the following steps, not necessarily in the following order:
- providing a first conduit and a second conduit, each conduit comprising a wall of metal defining a bore having an open end for connection and being substantially lined by a plastic liner, the liner ending within the bore to leave  
10 a short unlined section at the open end of the conduit;
  - arranging said first and second conduits with their ends abutting and welding said ends together to form a longer conduit;
  - 
  - providing a tubular bridging member of corrosion-resistant material  
15 dimensioned to fit inside the lined conduits, the bridging member having a first sealing portion toward one end thereof and a second sealing portion toward the second end, said sealing portions being interconnected by an intermediate portion, the length of said intermediate portion being sufficient to bridge the unlined portions of the abutting first and second conduits while  
20 the first and second sealing portions overlap said liners within the first and second conduits respectively;
  - with the first sealing portion of the bridging member located within the first conduit and overlapping the liner, expanding said first sealing portion radially so as to press the first sealing portion against the liner to form a first  
25 seal between the liner and the bridging member; and
  - with the second sealing portion of the bridging member located within the second conduit and overlapping the liner of the second conduit, expanding said second sealing portion radially so as to press the second sealing portion against the liner to form a second seal between the liner and the bridging  
30 member,
- whereby the liners, the first and second seals and the bridging member form a continuous barrier between the interior bore of the lined conduits and the metal of the

conduit walls, wherein the dimensions of the bridging member and the sequence of the method steps are such as to ensure that there is space between the material of the bridging member and the inside of the abutting ends of the conduits during at least an initial pass of said welding step.

5

2. A method of joining plastic-lined conduits as claimed in claim 1, wherein the ends of the lined conduits are brought together before the bridging member is introduced to the said conduits at the location of the abutting ends.

10

3. A method of joining plastic-lined conduits as claimed in claims 1 or 2, wherein, after at least an initial pass of welding has been performed between said conduits, the bridging member is installed via the said second conduit and subsequently expanded to form a seal between the lining of each said conduit and the bridging member.

15

4. A method of joining plastic-lined conduits as claimed in claims 1 or 2, wherein the bridging member is located adjacent the abutting ends of the conduits prior to starting said welding step, the outer diameter of the bridging member in its different portions being sufficient to leave a substantial gap between said conduit bore at said short unlined section and said bridging member.

20

5. A method of joining plastic-lined conduits as claimed in claim 1, wherein at a time before the ends of the first and second conduits are brought together the bridging member is fitted to the first lined conduit and the first sealing portion is expanded to form said first seal, with said second sealing portion and part of the intermediate portion remaining outside the first conduit.

25

6. A method of joining plastic-lined conduits as claimed in any preceding claim, wherein at a time after said first pass of welding and after introducing the bridging member at the location of the abutting ends, said intermediate portion of the bridging member is expanded radially so as to substantially eliminate any gap between the bridging member and the inside of the abutting ends of the conduits.

30

7. A method of joining plastic-lined conduits as claimed in claim 6, wherein the expanding of said intermediate portion is performed prior to expanding the first and second sealing portions, to allow escape of any fluid trapped in said gap.

5 8. A method of joining plastic-lined conduits as claimed in claims 6 or 7, wherein the expanding of any of said intermediate portion and first and second sealing portions is performed concurrently with subsequent passes of welding.

9. A method of offshore pipeline fabrication and laying, comprising the joining of  
10 first and second conduits by the repetition of the sequence of steps as claimed in any of claims 1 to 8 to produce a continuous pipeline, each conduit being a section of pipeline added in turn to the pipeline being laid.

10. A method of offshore pipeline fabrication and laying as claimed in claim 9,  
15 wherein said first conduit is the pipe section joined already to the pipeline and the second conduit becomes the first conduit after the second conduit has been interconnected with the first conduit.

11. A method of offshore pipeline fabrication and laying as claimed in claim 9,  
20 wherein said first conduit is the one being added to said pipeline and the second conduit becomes the first conduit after interconnection.

12. A method of offshore pipeline fabrication and laying as claimed in any of  
claims 9 to 11, wherein each said section is less than 100m long.

25

13. A method of offshore pipeline fabrication and laying as claimed in any of  
claims 9 to 12, wherein the joining of the conduits is performed while the first and  
second conduits are substantially horizontal, the assembled pipeline being bent first  
upwardly and then downwardly for entry into the sea.

30

14. A method of offshore pipeline fabrication and laying as claimed in any of claims 9 to 12 wherein the joining of the conduits is performed while the first and second conduits are inclined at an angle for entry into the sea.

5 15. A method of offshore pipeline fabrication and laying as claimed in claim 14, wherein the method is performed upon a J-Lay vessel and the expanding of the sealing portions of the bridging member is carried out by a swaging device mounted in the head of said tower.

10 16. A method of offshore pipeline fabrication and laying as claimed in any of claims 13 to 15, wherein the bridging member is introduced at the location of the abutting ends after the first and second conduits have been brought together.

17. In combination a tubular bridging member and at least one lined conduit  
15 specifically adapted for use together in a method as claimed in any of claims 1 to 16.

18. A combination as claimed in claim 17 having an outer diameter sufficient to allow free passage of the bridging member longitudinally through the lined portions of the conduits.

20

19. A combination as claimed in claims 17 or 18, wherein at least one formation is provided on each sealing portion to improve the grip between the bridging member and the liner of the conduits.

25 20. A combination as claimed in claim 19, wherein said formation comprises a series of circumferential formations to improve the grip between the bridging member and the liner of the conduits.

21. A combination as claimed in any of claims 17 to 20, wherein the end of the  
30 bridging member is chamfered to aid insertion of said bridging member into the lined conduit.

22. An expansion tool specifically adapted for use in the methods as claimed in any of claims 1 to 16, said tool performing the expansion of portions of said tubular bridging member as claimed in claims 17 to 21.

5 23. An expansion tool as claimed in claim 22, further comprising a means for conveying the tool to its desired location, in use.

24. An expansion tool as claimed in claims 22 or 23, comprising a single expanding means moveable longitudinally to expand different portions of the bridging member  
10 sequentially.

25. An expansion tool as claimed in claims 22 or 23, comprising multiple independent means for expansion of said first and said second sealing portions.

15 26. An expansion tool as claimed in claim 25, wherein said expansion means are located to permit sealing of both portions of the tubular bridging member without disengaging said tool from said bridging member.

27. An expansion tool as claimed in any of claims 25 or 26 further comprising  
20 means for radial expansion of said intermediate portion of the tubular bridging member so as to substantially eliminate the space between the abutting conduits and the bridging member.

28. An expansion tool as claimed in claim 27, wherein said expansion of said  
25 intermediate portion and first and second sealing portions is performed concurrently with subsequent passes of welding.

29. An expansion tool as claimed in claims 27 or 28, wherein said expansion of said intermediate portion is performed by fluid injection into the region between said first  
30 and second radial expansion means.

30. An expansion tool as claimed in claim 29, wherein said first and second expanding means are operated with a restricted force to serve as sealing means during said fluid injection.

5 31. A method as claimed in any of claims 1 to 16, wherein the bridging member is as claimed in any of claims 17 to 21 and is located adjacent said abutting ends by means of an expansion tool as claimed in any of claims 22 to 30, said tool engaging the inside of said bridging member by a restricted force, and then at a time after said member is located, using a greater force to expand said sealing portions.

10

32. A pipe laying apparatus specifically adapted for joining lined pipes using any of the methods as claimed in any of claims 1 to 16, or claim 31.

15 33. A pipe laying apparatus specifically adapted for joining lined pipes by a method as claimed in claim 32 including an expansion tool as claimed in any of claims 22 to 30.

20 34. A plurality of lined metal pipe sections and a corresponding plurality of bridging members suitable for use in assembling a pipeline using any of the methods as claimed in any of claims 1 to 16, or claim 31.

35. An apparatus substantially as hereinbefore described with reference to any of figures 1 to 5, or figures 6a and 6b, of the accompanying drawings.

25 36. A method substantially as hereinbefore described with reference to any of figures 1 to 5, or figures 6a and 6b, of the accompanying drawings.

37. A tool substantially as hereinbefore described with reference to any of figures 1 to 5, or figures 6a and 6b, of the accompanying drawings.

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